

# Community Preservation Committee Town of Arlington

## CPA Funding – FY2020 Final Application

One (1) electronic copy and three (3) hard copies of the completed application must be submitted to the CPAC **no later than 4 p.m. on December 10, 2018** in order to be considered for advancement to the final application stage, with the electronic copy sent to [AFidalgo@town.arlington.ma.us](mailto:AFidalgo@town.arlington.ma.us) and the hard copies to:

Community Preservation Committee c/o Amy Fidalgo  
Town of Arlington, 730 Massachusetts Ave., Arlington, MA 02476

Applications will be date stamped and assigned control numbers in the order that the hard copies are received. This PDF form may be completed on a computer using [Adobe Reader](#).

### 1. General Information

Project Title: Mill Brook and Wellington Park Revitalization: Phase 3

Applicant/Contact: Amber Christoffersen

Organization: Mystic River Watershed Association

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### 2. CPA Eligibility (refer to the chart on page A-4)

CPA Category (select one):

☐ Community Housing    ☐ Historic Preservation    ☐ Open Space    ☒ Recreation

CPA Purpose (select one):

☐ Acquisition    ☐ Creation    ☐ Preservation    ☐ Support    ☒ Rehabilitation & Restoration

### 3. Budget

Amount Requested: \$300,000    Total Project Cost: \$1,251,374

Signature \_\_\_\_\_

Date 10/10/18

**Please answer and document all questions on the following page**

## PROJECT DESCRIPTION

### 1. **Goals:** What are the goals of the proposed project?

The long-term goal of this proposed project is to expand both passive and active recreational opportunities in the Mill Brook Corridor (between Brattle and Grove Street) with a focus on Wellington Park, as well as to make Mill Brook an environmental, cultural and public health resource for the Town of Arlington. This project will serve as a model for future Mill Brook corridor projects and ultimately turn a hidden, underutilized waterfront into a linear park that connects people to the water and improves ecological quality of the riparian edge.

Since the Mystic River Watershed Association (MyRWA) first applied at the end of 2016, we have received two CPA grants to lead a participatory design and planning process to increase uses and visibility of the Mill Brook Corridor. This project funding has been leveraged by a Municipal Vulnerability Preparedness (MVP) Grant for flood and park improvements that will be completed by June 2019. In this third phase, MyRWA is requesting \$300,000 from CPA to implement the designs for Wellington Park.

### CPA Phase I

With the first CPA grant, MyRWA created a concept design for Wellington Park and feasibility analysis for a waterfront path from Grove to Brattle St. To see these deliverables, visit the project webpage:

[www.mysticriver.org/millbrook](http://www.mysticriver.org/millbrook). In creating these designs, we carried out the following activities:

- Convened ongoing meetings with a steering committee (comprised of MyRWA, Town of Arlington Planning and Community Development Department, Park and Recreation Commission, Conservation Commission, Mill Brook Working Group and Open Space Committee, and three resident/abutters)
- Issued an RFP, hired, drafted the scope and managed the design and engineering consultant Weston and Sampson
- Engaged more than 400+ residents through surveys, site walks, public meetings and park clean-ups.

Throughout the community design process, we have received an enormous amount of support for improvements along the Brook. There were also many people who didn't know what Mill Brook was or that it was hidden behind vegetation and fences in Wellington Park (a park that most people refer to as simply the "tennis courts"). We raised awareness of both the existence and potential for this waterway. As far as a consensus on the design intent, most people wanted a park design that respects and enhances the natural and wild qualities of the Brook.

Another aspect of this first phase of work is understanding how park improvements could coincide with water quality improvements. We have consolidated our analysis and recommendations for improving water quality along the Brook. See a summary in the Appendix 4 Water Quality Data. We will share this information and continue to collaborate with Town engineers. Adding to this positive momentum, the water quality grade improved from a D+ to C in 2018. We are also engaged with the Town on two initiatives: (1) a MyRWA led stormwater collaborative to identify ways to mitigate effects of polluter runoff and (2) a pilot effort with MyRWA, Environmental Protection Agency (EPA) and the Town of Winchester to reduce nutrient loading (phosphorous) into waterways.

Lastly, due to landownership issues that will likely take several years to resolve and due to the MVP funding for construction, the focus of our implementation efforts are on Wellington Park as it is Town-



owned. It is important to not lose sight of the larger linear park vision for connectivity from Brattle to Grove. MyRWA provided a final report to CPA on 9/24/2018 to document findings and work undertaken.

### **CPA Phase II + MVP Grant**

Currently, MyRWA is using funds from the second CPA grant to move design and engineering forward on the park. The most significant change and biggest win during this second phase was receiving one of two state Municipal Vulnerability Preparedness Program grants to implement a portion of the initial park design. Often it takes years to get from designing/planning to building; we started the initial design process in January 2017 and will see physical improvements to the park within 18 months. With this \$399,260 grant and design funding from our second CPA grant, we are preparing 100% design and construction drawings and a construction bid package to go out January 2019. Approximately half of the south bank of Mill Brook will be restored with a new path and boardwalk, overlook viewing area, enhanced streambank with removed fence and new shoreline plantings and wetland area that will replace invasive species and absorb flooding from the Brook. This first phase of construction will be complete by July 2019, in accordance with the state funding requirements.

As part of this current design phase, we mapped out the 50 and 100-year floodplain and evaluated the ability of any new infrastructure to withstand projected increases in flooding throughout the corridor. The new path, low boardwalk and plant-based flood storage are all planned to absorb flood waters and have a useful lifespan that is typical of any public infrastructure.

While the MVP funding is a win that leverages the Town's investment in planning/design funding and provides both flood storage and new public access amenities, there were added design fee costs for the flood storage components of the park. This affects how funding from the Phase II CPA grant was allocated and how we plan to move the remainder of the park design created with Phase CPA I grant. One last item that changed from assumptions during initiation of this project is the allocation in the Park and Recreation capital budget; this estimated amount of \$300,000 has been removed due to more immediate deferred maintenance issues that have become a pressing concern for the Park and Recreation Committee.

### **CPA Phase III Ask**

The estimated budget (capital and design fees) to complete the remainder of park revitalization and waterfront access plan is estimated at \$612,648. This budget would include two bridges, invasive plant removal, native plantings and paths around the full length of Wellington Park (see Appendix 2 Schematic Design). See the budget section for a more detailed explanation of the ask as it relates to CPA funding.

MyRWA is pursuing design and implementation in this phase (rather than just design funding) to follow construction of the MVP portion as soon as a possible for two reasons: (1) to continue the work under permits initiated in our current phase and (2) to demonstrate to the community the commitment to build the remainder of the park. Additionally, cost of construction materials escalate each year so building sooner will ensure that we stay close to current estimates.

We also would note that currently about 1.5 acres of the park is accessible to the public due to overgrown invasive species, a non-ADA compliant bridge and isolated and empty area of the park on the north bank of Mill Brook that is completely cut-off and hidden. This investment would double the functional size of the park and expand recreation opportunities – a cost far less than land acquisition for new open space

Per a discussion with the CPA Manager prior to this submittal, the budget included for the capital improvements is a preliminary estimate. The scope and budget is subject to change, and MyRWA can provide an addendum with additional details in late January 2019, after the construction bid package is submitted for the MVP grant.

Concurrently, MyRWA is looking to reduce costs, engage community and create a sense of “wilderness” along the north bank by working with Appalachian Mountain Club (AMC) Trailing Building program. Since 1919, the AMC has been supported by a professional trail building crew that maintains and constructs trails throughout the Northeast. From bridge construction and campsite development, to trail maintenance, to trail design and planning, the AMC trail crew has extensive experience in building natural and ADA compliant trails. We will have a proposal from AMC by the end of January and that time will understand how to whether to continue with Weston and Sampson or use AMC expertise, if it can be cost competitive while maintain the spirit of the design.

**2. Community Need:** Why is the project needed? Does it address needs identified in existing Town plans?

For decades, the Town of Arlington has been exploring the possibility of developing a linear park along Mill Brook, an important ecological and historical feature in the town. At one time, there were nine mills and seven millponds along the brook, which flows eastward from the Arlington Reservoir to Lower Mystic Lake and is part of the Mystic River Watershed. Four Town-owned recreational and conservation areas are accessible along Mill Brook— Reservoir/Hurd Fields, Wellington Park, Cooke’s Hollow and Meadowbrook Park. The first official concept study for a Mill Brook Linear Park, initiated by Mia Leher in 1977, still remains an important blueprint for today.

The project is eligible for CPA funding because it:

- Preserves or utilizes currently owned Town Assets (Mill Brook)
- Save resources that would otherwise be threatened (invasive plants and un-stabilized shoreline threaten Mill Brook)
- Demonstrates consistency with other current and widely scrutinized planning documents that have been adopted by the Town of Arlington (Mill Brook Linear Park Study, 2009; Open Space and Recreation Plan, 2015-2022; Arlington Master Plan, 2015-all outlined below)
- Received endorsement from other municipal boards or departments (Open Space Committee)
- Serves more than one CPA purpose (Open Space & Recreation).
- Leverage additional public and/or private funds. (Complement the efforts of the Parks and Recreation Department, which has slated this park for capital improvement in the next 4-6 years. Starting this community outreach and design work now would allow time to develop a comprehensive plan for this area, with the ability to help inform the Town’s implementation strategy.)

The proposed project meets the following selection criteria from the Community Preservation Plan, specific to Open Space & Recreation:

- Project located along key open space sites: Mill Brook and Wellington Park
- Contains natural resources: surface water body, wetlands
- Land that is contiguous to a recreation site: Wellington Park
- Land that connects the recreation site to open space: Wellington Park to the Mill Brook Corridor
- Open Space Priority: Mill Brook Corridor (more detail below)

This project is in-line with several planning documents that have been adopted by the Town of Arlington:

A. State-approved *Open Space and Recreation Plan (OSRP)*, 2015-2022. The plan identifies Mill Brook Corridor as one of the Action Plan focus locations; specific actions that align with CPA funding include:

- 2-a-6. Protect and enhance the water quality and ecological integrity of Mill Brook as it meanders through Town from the Reservoir, through many neighborhoods and Meadowbrook Park, and into the Lower Mystic Lake.
- 2-a-7. Work with the Redevelopment Board and others on future development in the Mill Brook Study Area and pursue opportunities to expand and enhance public access to Mill Brook by linking existing and new open spaces.
- 2-a-12. Work to protect endangered species, such as Englemann's Umbrella Sedge, and to eliminate invasive plants, such as Phragmites, Japanese Knotweed, Garlic Mustard, Black Swallowwort, and Oriental Bittersweet.
- 4-c-4. Pursue initiatives to improve public access and create new pathways along Mill Brook and around Spy Pond.

B. *Town of Arlington Master Plan*, 2015

In addition to implementing the OSRP, this plan recommends a Mill Brook plan that creating “landscape and building design standards, and establish requirements for public access to the Mill Brook, and the preservation of views (page 144).” This project will contribute to this recommendation.

C. *Mill Brook Linear Park Study*, 2009

This study looks at opportunities to restore the environmental and visual qualities of Mill Brook by creating a greenway with pedestrian facilities and access and providing enhanced recreational opportunities. It recommends creating a comprehensive plan for the Mill Brook Study Area, including daylighting options, flood plain management, and public access.

Specific to this project, the study states: “This entire segment of Mill Brook from Brattle Street to Grove Street presents tremendous potential to highlight the brook in its natural, uncovered state. A vibrant, renewed park and recreational area would be accessible to the Minuteman Bikeway, Mass. Ave., and the High School on the east side of Grove Street.”

**3. Community Support:** What is the nature and level of support for this project? Include letters of support and any petitions.

As mentioned in the project summary, we are excited about the momentum for this project, particularly by residents who see the potential of the underutilized and hidden park and waterfront. Over the past year, two different short films have been produced about this project. One will be complete in early 2019 and the other can be viewed at this link (<http://acmi.tv/videos/linear-park-bring-new-life-mill-brook/>). We’ve also partnered with the Old Schwamb Mill on their 8-month exhibit “A Brook Runs Through It: Arlington’s Mill Brook Legacy.” The plans for this section of Mill Brook are displayed, offering concrete plans for a new vision of the brook’s future that balances the historic perspective.

**4. Project Documentation:** Attach any applicable engineering plans, architectural drawings, site plans, photographs, any other renderings, relevant studies or material.

Appendix 1: Phasing Plan for CPA Application

Appendix 2: Schematic Design Plan

Appendix 3: Photographs of existing conditions

5. **Timeline:** What is the schedule for project implementation, including a timeline for all critical milestones?

Below is an initial timeline for Phase III; this will be refined and adjusted per the January revision outlined above.

Budget/Scope Revision for Phase III Application: January 2019

Phase II Completion & Grant Wrap-up/report: July 2019

Design Development & Construction Documents: Summer-Fall 2019

Community Outreach & Coordination with Park & Recreational Committee: Ongoing

Project Completion: June 2020

Grant Close-Out and Reporting: June 2020

6. **Credentials:** How will the experience of the applicant contribute to the success of this project?

The Mystic River Watershed Association (MyRWA) is a 501(c3) non-profit organization that works “to protect and restore the Mystic River, its tributaries and watershed lands for the benefit of present and future generations and to celebrate the value, importance and great beauty of these natural resources.” Established in 1972, MyRWA has met success in ensuring local implementation of the Clean Water Act, the clean-up of local hazardous waste, and the protection of nearby wetlands. Established in 1972, MyRWA has met success in ensuring local implementation of the Clean Water Act, the clean-up of local hazardous waste, and the protection of nearby wetlands. In 2000, MyRWA instituted a certified water quality monitoring program that incorporates the help of trained, local volunteers. Local governments now depend on our water quality data to make watershed decisions, to take enforcement actions and the US EPA has relied on results from our monitoring program to give the Mystic River Watershed a formal grade every year since April 2007. We have worked with seven municipalities to make green infrastructure improvements based on this water quality data. 2010 saw the launch of our water chestnut removal program by which 1,000 of volunteers/year remove this invasive species from our water. Last year, we launched the Greenways Initiative, whereby we are working to revitalize and restore the parklands and pathways along our River. In 2016, MyRWA launched a herring education project with local school districts that will reached 550 students; and broadcast the migration to 6,000 users using an underwater camera and web platform.

MyRWA has demonstrated significant organizational experience during the past five years in properly managing and executing grant agreements and project deliverables of similar size. Most relevant the Mystic River Watershed Association has CPA grants from both the Town of Arlington and the City of Somerville. For both Somerville and Arlington CPA, we have closed out the Phase I funding with reports and project deliverables. We are in the middle of Phase II for both projects.

Highlights from the last five years of other large and complex grants include: National Fish and Wildlife Mystic Water Chestnut Removal Project (\$50,000), 2013 Urban Waters Malden River Partnership (\$60,000), 2016 National Fish and Wildlife (\$49,974.79) for volunteer led invasive species removal at area parks, 2016 US Environmental Protection Agency Environmental Education (\$80,116) for the river herring education project in local schools. These grants have been closed out and met all deliverables and cost estimates. Currently we are managing a 2016 Urban Waters Small Grant (\$75,000) for stormwater

education collaborative & litter prevention, a 319 grant for bio-retention basins in Arlington (\$54,834), as well as two Barr Foundation proposals for a total of \$205,000. To date all reports have been completed, and all deliverables are on target for completion.

MyRWA staff has experience working cooperatively with municipal and community leaders and conducting outreach and education in the watershed communities. Amber Christoffersen, Greenways Director at MyRWA, will be the project manager. As the project manager, she will manage the consultant contract ensuring all final deliverables are complete and providing all reports (financial and narrative) to CPA, liaise with the named partners and serve as the participatory design lead to coordinate community engagement.

In her role as Greenways Director, Amber Christoffersen has led participatory design processes for riverfront open spaces in Arlington, Charlestown, Everett, Malden, Medford and Somerville. She holds a Master's Degree in Landscape Architecture from the University of Georgia and a Bachelor's Degree in Economics from the College of William and Mary.

7. **Budget:** What is the total budget for the project and how will funds be sourced and spent? All items of expenditure must be clearly identified. Distinguish between hard and soft costs and contingencies. (NOTE: CPA funds may not be used for maintenance.)

The scope and below budget is subject to change and will include more details with an addendum in late January 2019, after the construction bid package is submitted for the MVP project.

#### **Preliminary Capital Budget**

Site Prep and Demo	\$	50,000
Earthwork and Grading	\$	25,000
Invasive and Overgrowth	\$	45,000
Pathways and Bridges	\$	183,000
Site Amenities	\$	75,000
Planting	\$	24,000
<b>SUBTOTAL</b>	<b>\$</b>	<b>402,000</b>
Construction Contingency (20%)	\$	80,400
Contractor Mobilization (15%)	\$	72,360
Design Fee (12%)	\$	57,888
<b>TOTAL</b>	<b>\$</b>	<b>612,648</b>

**8. Other Funding:** What additional funding sources are available, committed, or under consideration? Include commitment letters, if available, and describe any other attempts to secure funding for this project.

Below is a table showing funds in-hand, pending funding (applications that are in the works) and potential funding (grants that we have identified as viable). Even if we receive \$300,000 from CPA, and additional money from the other identified sources, we will be short \$137,648 or ~10% of the total project based on the capital cost estimate that Weston and Sampson has provided. We will continue to refine this estimate once the construction bid set is complete in early January and explore the potential for AMC's trail building program as a cost-saving and volunteer engagement alternative.

Funding Source	Funds in Hand	Pending Funding	Potential Funding	Notes
CPA Phase I	\$ 56,783			
CPA Phase II	\$ 172,523			
State MVP Grant	\$ 399,420			
CPA Phase III		\$ 300,000		
CDBG		\$ 100,000		Application due 01.31.19
MassTrails			\$ 75,000	Application due 02.01.19
Judy Record Foundation			\$ 10,000	Rolling application

<b>TOTAL PROJECT*</b>	<b>\$ 1,251,374</b>	
<b>CPA FUNDING</b>	\$ 529,306	43%
<b>NON CPA FUNDING</b>	\$ 584,420	47%
<b>FUNDING GAP</b>	\$ 137,648	10%

**9. Maintenance:** If ongoing maintenance is required for your project, how will it be funded?

No maintenance is proposed as part of this project funding. The improvements will have implications on future maintenance of this area. We will be working closely with the Town Department of Public Works to draft a plan on how this will be achieved, developing partnerships with Town staff, MyRWA and local community groups. Given MyRWA's experience with volunteer-driven invasive removal, we would provide recommendations on how a volunteer program or Friends group could fill a part in future maintenance. We hope that this conversation and working process could provide a model template for a collaborative approach to invasive plant management for the Town going forward.

**10. Impact on Town Budget:** What, if any, potential secondary effects will your proposed project have on the Town's Operating Budget? Are there any capital projects that rely on the successful completion of your project?

See answer above.

**ADDITIONAL INFORMATION:** Provide the following additional information, as applicable.

1. **Control of Site:** Documentation that you have control over the site, such as a Purchase and Sales Agreement, option or deed. If the applicant does not have site control, explain what communications have occurred with the bodies that have control and how public benefits will be protected in perpetuity or otherwise.

The Town of Arlington owns this site. They support this project, as evidenced by CPA funding for Phase I of this project. As mentioned above, we've had several conversations with the Condo Association Trustees, the owner of the private land along the Brook, and are making process in discussions about potential access and easements.

2. **Deed Restrictions:** In order for funding to be distributed, an appropriate deed restriction, meeting the requirements of Chapter 184 of Mass General Laws pursuant to section 12 of the Community Preservation Act, must be filed with the CPC. Provide a copy of the actual or proposed restrictions that will apply to this project.

No deed restriction.

3. **Acquisitions:** For acquisition projects, attach appraisals and agreements if available. Attach a copy of the deed.

Not applicable.

4. **Feasibility:** Provide a list of all further actions or steps that will be required for completion of the project, such as environmental assessments, zoning approvals, and any other known barriers to moving forward.

We are initiating permitting in this current phase of work with MWRA and the Conservation Commission through the NOI. This should be completed during Phase II so should not be an issue in Phase III.

5. **Hazardous Materials:** Provide evidence that the proposed project site is free of hazardous materials or there is a plan for remediation in place.

Likely not applicable, this will be explored during this initial phase of design and analysis.

6. **Permitting:** Provide evidence that the project does not violate any zoning ordinances, covenants, restrictions or other laws or regulations. What permits, if any, are needed for this project? Provide the expected date of receipt for necessary permits, and copies of any permits already acquired.

At this point, it would be naive to assume that we will get through all permitting during Phase II. However, we anticipate that we will initiate the permitting progress as this is typically done in the 75% design phase. To limit concerns with the Conservation Commission, we have involved the agent heavily in the hiring of the design consultant and will continue to do so throughout the design process. We've also selected a consultant with extensive municipal permitting experience as well with federal agencies such as the Army Corps of Engineers.



7. **Environmental Concerns:** Identify all known wetlands, floodplains, and/or any natural resource limitation that occur within the boundaries of your submission.

This project will flag wetland areas along Mill Brook to inform location of paths and potential areas for stabilization.

8. **Professional Standards:** Evidence that appropriate professional standards will be followed if construction, restoration or rehabilitation is proposed. Evidence that the applicant and the project team have the proven or potential capacity to conduct the scope and scale of the proposed project, as evidenced by project leaders with appropriate qualifications and technical experience or access to technical expertise.

Not applicable at this time.

## 9. Further Attachments

### FURTHER ATTACHMENTS

Appendix 1: Phasing Plan for CPA Application

Appendix 2: Schematic Design Plan

Appendix 3: Photographs of existing conditions

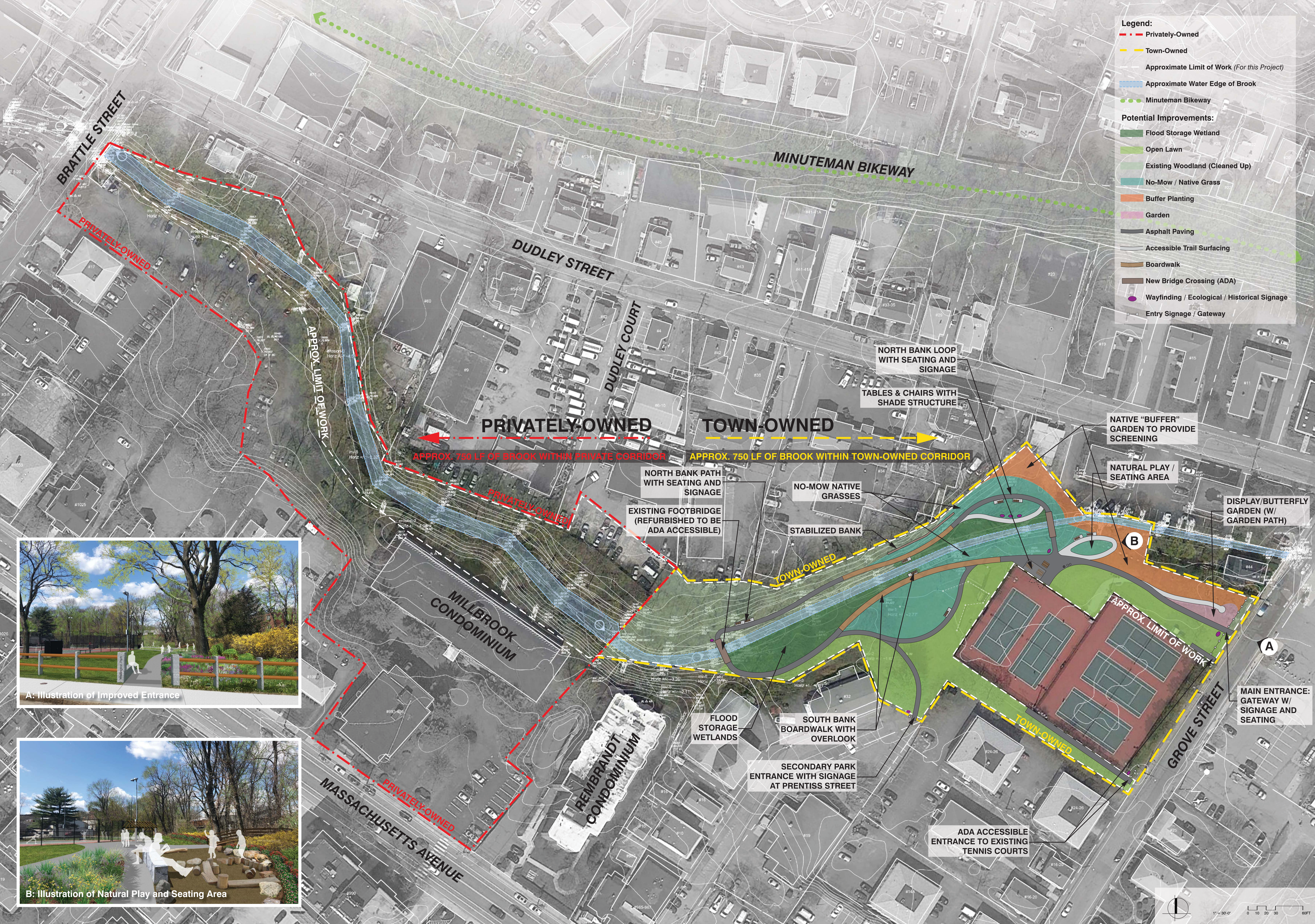
Appendix 4: Water Quality Data





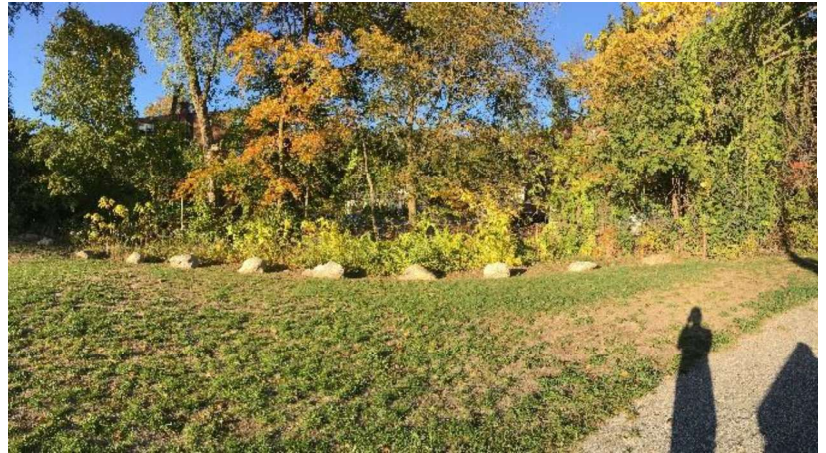
**CPA GRANT SUBMITTAL**  
**MVP PROJECT LIMITS AND FUTURE MASTER PLAN IMPROVEMENTS**  
**MILL BROOK & WELLINGTON PARK**  
**ARLINGTON, MA**  
**December 10, 2018**





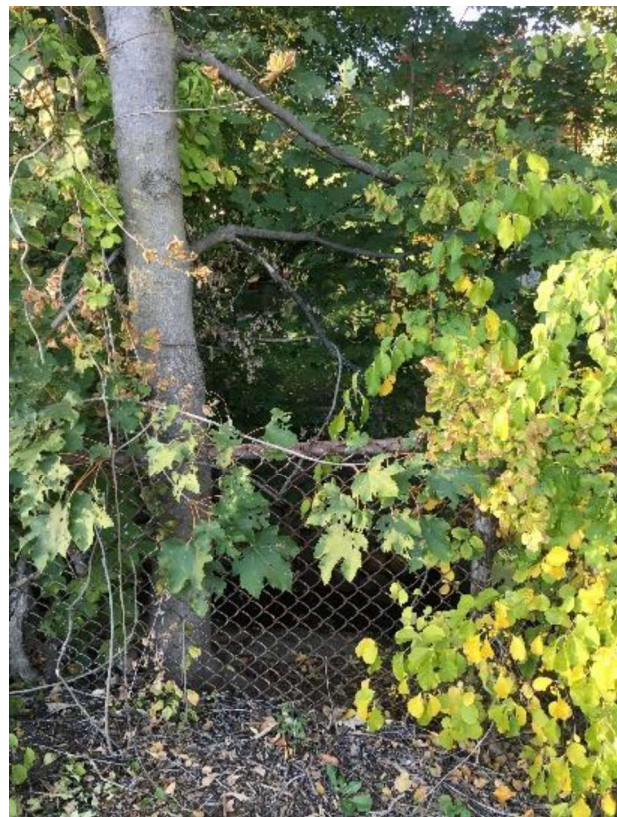
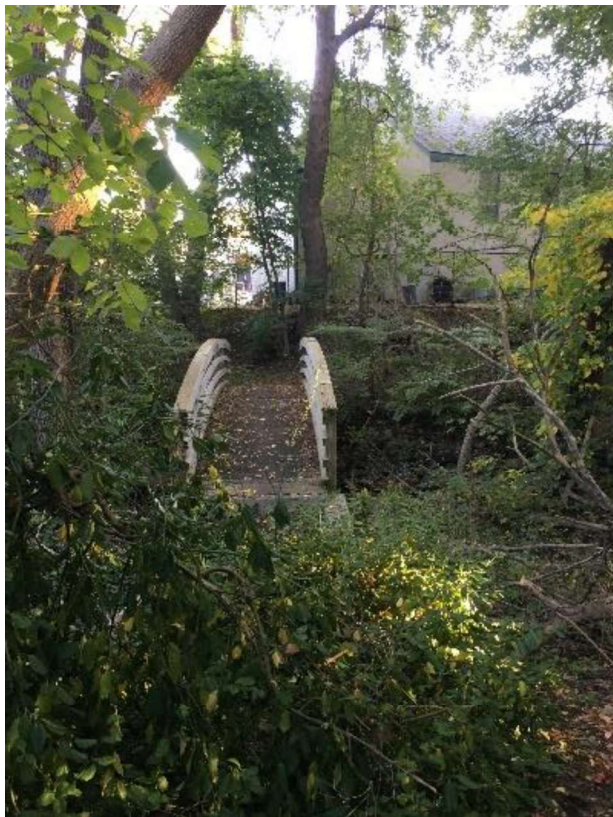


### Appendix 3: Photos



Left: Entrance to the park from Grove Street (Mill Brook behind vegetation on right)

Right: Vegetation and overgrown planted area in the front of Mill Brook.



From Left: Bridge connecting south and north bank of the brook; Riparian edge of the brook, along northeast end Wellington Park – chain-link fence and invasive plants.



**Mystic River Watershed Association**  
**Appendix 4 : Mill Brook Water Quality Summary**  
**December 10, 2018**

Mill Brook is a tributary of the Mystic River running through Arlington, MA. It is a living system, with documented fish populations of white sucker and migratory river herring in the spring and summer. But it is also a stream that suffers from hydrological changes and pollution problems typical of many urban water bodies. The stormwater pipes that carry the rainwater from roofs and streets from a large percentage of the area of Arlington empty into Mill Brook (Figure 1). Stormwater carries pollutants and vastly increases the flow of Mill Brook in wet weather.



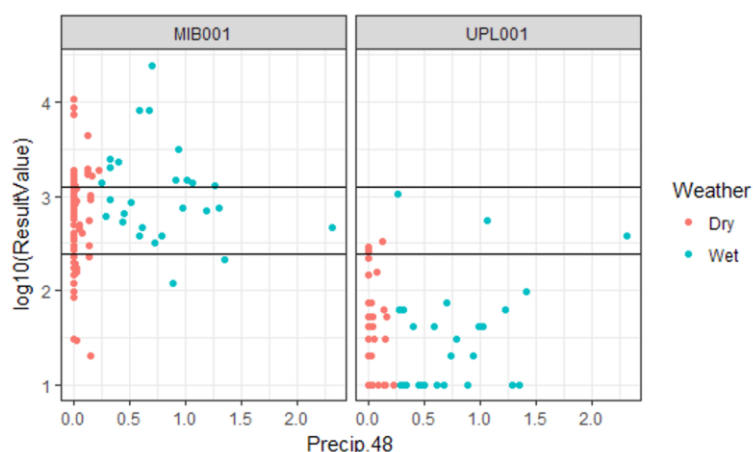
**Figure 1. Stormwater drainage areas, Mill Brook.** Rainwater from rooftops and all paved surfaces in green areas of Arlington drains directly to Mill Brook.

**Baseline monitoring and bacteria impairment**

The Mystic River Watershed Association has monitored water quality in Mill Brook for the past 15 years, along with 14 other sites, in a program approved by the federal Environmental Protection Agency (US-EPA) and Massachusetts Department of Environmental Protection (Mass-DEP). A principal pollution problem tracked by our program is the contamination of the stream by untreated wastewater.

Mill Brook has received a water quality grade between **D and C-** in the past three years, in the annual Mystic Watershed Water Quality Report Card issued by the EPA in collaboration with our organization. This grade is based on the percentage of samples that meet state water quality recreational guidelines for bacteria levels. Bacteria (*E. coli*) levels are a signal of the extent of wastewater contamination.

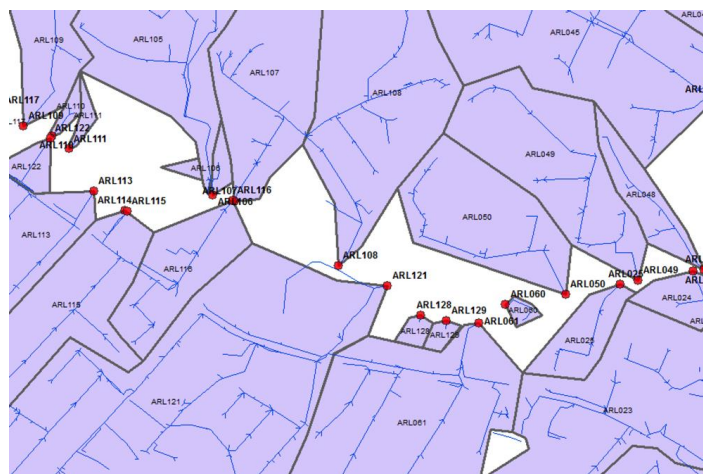
The principal sources of wastewater contamination in Mill Brook—as in most urbanized streams—are broken and leaky stormwater and wastewater pipes underground, and illicit connections of waste pipes to the stormwater system. The mechanisms that introduce untreated wastewater into streams are accelerated in rain events, so water quality is typically worst in wet weather (Figure 2). In the 2017 report card, Mill Brook met swimming standards only 17% of time and boating standards only 66% of the time when more than ¼ inch of rain had fallen in the previous 48 hours.



**Figure 2. Wet and dry weather bacteria values vs. precipitation in the previous 48 hours.** Mill Brook (left) baseline values 2008-2017. Horizontal lines show state swimming (lower line) and boating (upper line) recreational water quality standards. Note that one or both standards are almost always exceeded when more than 0.25 in of rain has fallen in the previous 48 hours (green points). Compare these results with baseline results from Upper Mystic Lake (right), where standards are rarely exceeded even in wet weather.

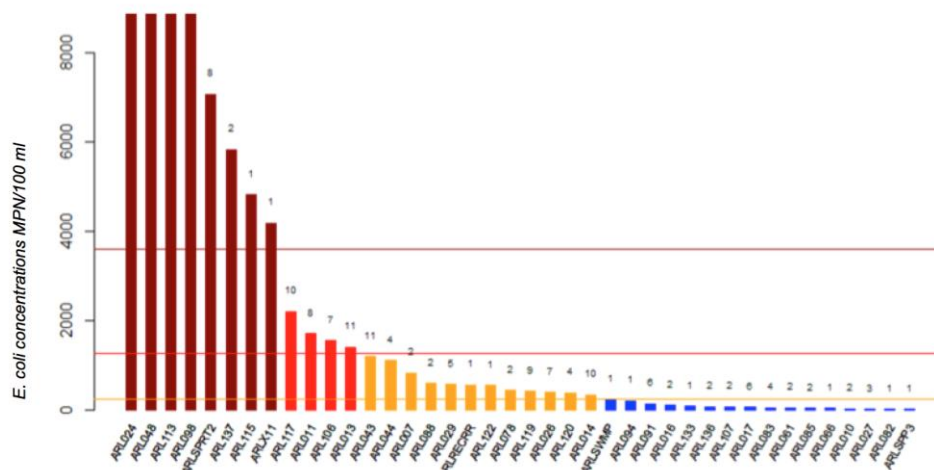
### Hotspot monitoring

In order to help the municipality find the sources of bacteria contamination, our organization has also monitored the water coming directly out of stormwater pipes at **stormwater outfalls** in our Hotspot Monitoring program. Details are shown in Figures 3 and 4.



**Figure 3. Catchments, pipe networks, and outfalls.** Stormwater drainages emptying into Mill Brook. Each drainage area, outlining a single pipe network, is given the same name as the outfall associated with it. Note variation in area of land draining to any given pipe.

### Hotspot monitoring results Arlington



**Figure 4. Hotspot sampling results by stormwater outfall.** Data collected 2008-2016. Bars show median *E. coli* concentrations observed. Number above bars show number of samples (first four bars all single samples, values >9000). Orange and yellow lines show state boating and swimming recreational standards respectively. Maroon, red, and orange bars report results exceeding recreation standards.

Some stormwater outfalls, including those connected to networks that drain large areas, showed repeatedly high bacteria levels over multiple surveys, especially in wet weather. Some outfalls showed little or no evidence of contamination. After all our Hotspot surveys, we shared results with the municipality and with US-EPA.

### Future work

The Town of Arlington devotes much effort in tracking sources and remediating problems, under the general guidance of the EPA Municipal Separate Storm Sewer System (MS4) Permit. We hope that the additional information we have been able to provide in the past about bacteria levels in the stream and in water in stormwater pipes draining to Mill Brook has helped inform the town's Illicit Discharge Detection and Elimination (IDDE) program. The solution to bacteria problems is the necessarily slow and expensive repair of old infrastructure.

Our organization is proud to count Arlington as a founding member of the Mystic River Watershed Stormwater Education Collaborative, a coalition designed to efficiently share knowledge of best practices and educational materials for the public on stormwater pollution, helping member municipalities fulfill their obligations under the MS4 permit.

A final pollution problem in the Mystic River watershed—not unique to Mill Brook or to Arlington—is nutrient pollution, excess phosphorus in particular, which can impair the ecological health of freshwater streams. Over the past 5 years, the Mystic River Watershed Association has been engaged in a study to measure the amount of phosphorus entering waterways and its effects. The study has been done in collaboration with US-EPA, the United States Geologic Survey (USGS), Mass-DEP and other partners. Arlington is one of two municipalities in our watershed selected by US-EPA to engage in a robust stakeholder engagement program, led by US-EPA, coming out of this study. The purpose of the series of meetings is to educate municipal staff on the nature and extent of the problem in our



watershed, and to identify cost-effective solutions to reducing nutrient pollution. We look forward to continue working with the municipality on this important problem in the future.

## Appendix 4, Addendum 1. US-EPA Water Quality Report Card for the Mystic River Watershed

